

Upon entering a tropical hardwood hammock in south Florida, hues of green and brown dominate the landscape. As one's eyes adjust to the subdued lighting, however, an observant naturalist perceives something else: colors seemingly out of place.

The eyes then focus on what appear to be porcelain ornaments hung on the trunks of wild tamarind and Jamaica dogwood. Soon the eyes catch other touches of color in the canopy. The deep blue of *barbouri*, the orange of *ornatus*, the yellows of *roseatus* or the swirling browns of *testudineus*---nature's artwork at its best, magnificently displayed by these arboreal snails.



Color variety *barbouri* (photo by Rob Bennetts)

## DESCRIPTION

The Florida tree snail (*Liguus fasciatus*) is a mollusk that lives in a colorful, cone-shaped shell. It grows to two inches in length, on average, but may reach three. The shell size and thickness vary with location, color variety, food, and time of year.

Fifty-nine color varieties of the Florida tree snail have been described. Several are now extinct and others are extremely rare. They range in color and pattern from white to black, solid to banded, dull to glossy. Vivid yellows, browns, blues, and greens are often displayed as stripes, flames, and washes.



*vonpaulseni* (photo by Steve Sparks)

The names of some varieties describe how they look. Others were named for individuals or the location where found. For example, *delicatus* evokes a sense of daintiness, *wintei* for its founder Erwin Winte, Everglade's first park ranger, and *matecumbensis* for Upper Matecumbe Key where it was first discovered.

## RANGE

*Liguus* are native to Cuba, Hispaniola, the Isle of Pines and Florida. It is widely accepted that they originated from Cuba, but it is unclear how they arrived in south Florida. The lack of early fossil evidence of *Liguus* in Florida suggests that its arrival was relatively recent in geologic time.

The former range of *Liguus* extended from Key West north to Boca Raton and west to Marco Island. Habitat destruction, however, has reduced that range to a few islands in the Florida Keys and the Ten Thousand Islands, small Atlantic Coastal Ridge populations, and larger populations in Everglades National Park and Big Cypress National Preserve. Because the snail is vulnerable to fire, flood, freeze and human impacts, its chances for expansion or protection outside of south Florida's public lands are poor.

## HABITAT

Florida tree snails are found on tropical and sub-tropical hardwood trees. Groups of such trees are called hammocks which are often isolated by water or vegetation such as sawgrass, buttonwood, cypress, or pines.



*Liguus* are found on the tree islands known as hammocks. (photo by Rob Bennetts)

The trees preferred by the snails are wild tamarind (*Lysiloma latisiliqua*) and Jamaica dogwood (*Piscidia piscipula*). Other commonly used trees include poisonwood (*Metopium toxiferum*), pigeon plum (*Coccoloba diversifolia*), and members of the stopper (*Eugenia* spp.) family.



Wild tamarind (photo by Rob Bennetts)

## LIFE HISTORY



Florida tree snails exhibit an annual cycle having active and inactive periods. They are most active when moisture levels are high, which occurs during Florida's wet season. Snails hatch, feed, grow, mate, and lay eggs during this time. During the dry season, they seal themselves to tree trunks and branches to conserve vital body moisture and are in a state of inactivity, called aestivation. They may temporarily emerge from aestivation, however, if rains occur during the dry season.

Shell growth starts and stops with the wet and dry seasons, producing a visible annual growth scar, called a "varix", much like a growth ring on a tree. One can use these scars to determine a snail's age if care is taken not to count minor scars resulting from broken shells or seasonal spurts of growth.



The color of new growth is more vivid. (photo by Steve Sparks)

Florida tree snails live four or five years, on average, but some have been recorded at nine years. They reach sexual maturity in two to three years. Like many snails, *Liguus* are hermaphroditic, meaning they have both male and female sex organs.

Courtship and mating occur in the late summer or early fall. Three to four weeks later, the female burrows up to the length of her shell into the leaf litter of the hammock floor and lays up to 50 elliptical, pea-sized eggs. The young snails, called buttons, hatch at the beginning of the rainy season. Adults also emerge from aestivation at this time and the cycle begins anew.



Tree snail laying eggs (photo by Deborah Jansen)

## FOOD HABITS



Feeding trail (photo by Steve Sparks)

Florida tree snails feed on the minute lichens, algae, and fungi that grow on the bark and leaves of trees. They feed by slowly moving forward, swaying from side to side, scraping the surface with their radulae, a snail's version of teeth. It is thought that this type of feeding is one reason for the preference for smooth-barked trees. Rough-barked

trees would be more difficult to scrape for food. The presence of "feeding trails" on the bark of host trees indicates that tree snails are nearby.

## POPULATION IMPACTS

Tree snail populations are impacted by natural and human-caused processes. They include predation, freezes, fire, hurricanes, floods, droughts, habitat alteration and pesticide spraying.

Predators include birds, the carnivorous snail *Euglandina*, and ground-scavenging animals such as raccoons, opossums, armadillos, land crabs and ants.

The tree snails' fragile shell offers little protection from cold weather which limits their survival north of their current range. Although fire is a necessary component of the south Florida ecosystem, natural wildfires are often extinguished because of danger to property or traffic visibility. The resulting buildup of vegetation produces intense fires which may kill snails and destroy hammocks. Human-caused fires occurring outside the natural fire season may be equally destructive.



*Prescribed fire under the right conditions can be beneficial to many habitats. (photo by Deborah Jansen)*

Natural processes, like fire and hurricanes, may have impacts on tree snail habitat but are often necessary for its long-term maintenance. Many species in south Florida have adapted to such events.

The series of canals and water control structures in south Florida have altered the natural flow of water. Human manipulation of water and its concentration in the remaining wetlands can impact the Florida tree snail by being too wet or too dry at the wrong time of year.

Flooding during the winter months will kill eggs that had been laid in the leaf litter the previous fall. Extended droughts may



*Flooded tree snail hammock (photo by Jeff Ripple)*

desiccate the snails in spite of their protective seal.

The loss of habitat by land development probably has had the most impact on snail populations. The effects of a bulldozer need not be explained, and it continues today in unprotected portions of the snails' range.

In the mix of public and private land outside of the federal parks, the spraying of pesticides for mosquito and crop pest control may kill Florida tree snails. Even if some hammocks are in public ownership where direct spraying is prohibited, aerial drift occurs.

## PROTECTION

Florida tree snails are listed by the Florida Fish and Wildlife Conservation Commission as a "Species of Special Concern". This category indicates that they warrant special attention because of their restricted range and their vulnerability to exploitation or environmental changes.

In 1885, even before the Overseas Railroad and the invention of swamp buggies facilitated access into south Florida and the Keys, individuals such as Charles T. Simpson collected his first *Liguus*. It became a hobby for many and an obsession for some.

Collecting occurred in Everglades until it became a national park in 1947, and in Big Cypress National Preserve until 1989. Today, collecting is not permitted on public or private lands in south Florida.

Between 1957 and 1980, a cooperative project between the National Park Service and snail collectors resulted in the relocation of 51 color forms in Everglades National Park and Big Cypress National Preserve. Since then, several of these have been lost from their original hammocks due to land development.

## RESEARCH

Most of the past research on *Liguus* has focused on the taxonomy and distribution of color varieties. Current research is shifting to the ecology of tree snails and how management actions will influence their survival.

Many issues currently face land managers in south Florida. Ecosystem restoration requires knowledge of the impacts of water and fire management decisions on all components of the system. Research on plants and animals, such as the Florida tree snail, enhances wise decision-making by those tasked as stewards of the south Florida ecosystem.



(photo by Jeff Ripple)

## Acknowledgments

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Cover photo: Steve Sparks.

# The Florida Tree Snail

(*Liguus fasciatus*)



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